APPENDIX C

Answers

Here are the "answers" to the exercises for the chapters and the unit reviews. As we said in Chapter 1, the answers are outlines of the complete solution. Your solution should follow the model of the Step-By-Step examples, where appropriate. You should explain the context, show your reasoning and calculations, and draw conclusions. For some problems, what you decide to include in an argument may differ somewhat from the answers here. But, of course, the numerical part of your answer should match the numbers in the answers shown.

CHAPTER 2

1. Categorical
2. Categorical
3. Quantitative
4. Quantitative
5. Answers will vary.
6. Answers will vary.
7. *Who*—2500 cars
   What—Distance from car to bicycle
   Population—All cars passing bicyclists
8. *Who*—30 similar companies
   What—401(k) employee participation rates
   Population—All similar companies
9. *Who*—Coffee drinkers at a Newcastle University coffee station
   What—Amount of money contributed
   Population—All people in honor system payment situations
10. *Who*—120 first-run movies in 2005
    What—Length of the movie and profit
    Population—All first-run movies
11. *Who*—25,892 men aged 30 to 87
    What—Fitness level and cause of death
    Population—All men
12. *Who*—10 crankshafts at Cleveland Casting
    What—The pouring temperature of molten iron
    Population—All Cleveland Casting crankshafts
13. *Who*—54 bears
    Cases—Each bear is a case.
    What—Weight, neck size, length, and sex
    When—Not specified
    Where—Not specified
    Why—To estimate weight from easier-to-measure variables
    How—Researchers collected data on 54 bears they were able to catch.
    Variable—Weight
    Type—Quantitative
    Units—Not specified
    Variable—Neck size
    Type—Quantitative
    Units—Not specified
    Variable—Length
    Type—Quantitative
    Units—Not specified
    Variable—Sex
    Type—Categorical
14. *Who*—Students
    Cases—Each student is an individual.
    What—Age, race or ethnicity, number of absences, grade level, reading score, math score, and disabilities/special needs
    When—Current
    Where—Not specified
    Why—Keeping this information is a state requirement.
    How—The information is collected and stored as part of school records.
    Variable—Age
    Type—Quantitative
    Units—Not specified, probably years (perhaps years, months)
    Variable—Race or ethnicity
    Type—Categorical
    Variable—Days absent
    Type—Quantitative
    Units—Number of days
    Variable—Current grade level
    Type—Categorical (could be quantitative for some purposes)
    Variable—Standardized reading score
    Type—Quantitative
    Units—Not specified
    Variable—Standardized math score
    Type—Quantitative
    Units—Not specified
    Variable—Disability/special needs
    Type—Categorical
15. *Who*—Arby's sandwiches
    Cases—Each sandwich is a case.
    What—Type of meat, number of calories, and serving size
    When—Not specified
    Where—Arby's restaurants
    Why—To assess nutritional value of sandwiches
    How—Report by Arby's restaurants
    Variable—Type of meat
    Type—Categorical
    Variable—Number of calories
    Type—Quantitative
    Units—Calories
    Variable—Serving size
    Type—Quantitative
    Units—Ounces

16. *Who*—1180 Americans
Cases—Each of the 1180 Americans surveyed is an individual in this poll.
What—Region, age, political affiliation, and whether or not the person voted in the 2006 midterm congressional election
When—First quarter of 2007
Where—United States
Why—The information was gathered for presentation in a Gallup public opinion poll.
How—Phone survey
Variable—Region
Type—Categorical
Variable—Age
Type—Quantitative
Units—Not specified (years?)
Variable—Party affiliation
Type—Categorical
Variable—Voted in last election?
Type—Categorical

17. *Who*—882 births
Cases—Each of the 882 births is a case.
What—Mother's age, length of pregnancy, type of birth, level of prenatal care, birth weight of baby, sex of baby, and baby's health problems
When—1998–2000
Where—Large city hospital
Why—Researchers were investigating the impact of prenatal care on newborn health.
How—Not specified exactly, but probably from hospital records
Variable—Mother's age
Type—Quantitative
Units—Not specified; probably years
Variable—Length of pregnancy
Type—Quantitative
Units—Weeks
Variable—Birth weight of baby
Type—Quantitative
Units—Not specified, probably pounds and ounces
Variable—Type of birth
Type—Categorical
Variable—Level of prenatal care
Type—Categorical
Variable—Sex
Type—Categorical
Variable—Baby's health problems
Type—Categorical

18. *Who*—385 species of flowers
Cases—Each of the 385 species at each of the 47 years is a case, for a total of 18,095 cases.
What—Date of first flowering
When—Not specified
Where—Southern England
Why—The researchers believe that early flowering indicates a warming of the overall climate.
How—Not specified
Variables—Date of first flowering
Type—Quantitative
Units—Days

19. *Who*—Experiment subjects
Cases—Each subject is an individual.
What—Treatment (herbal cold remedy or sugar solution) and cold severity
When—Not specified
Where—Not specified
Why—To test efficacy of herbal remedy on common cold
How—The scientists set up an experiment.
Variable—Treatment
Type—Categorical
Variable—Cold severity rating
Type—Quantitative (perhaps ordinal categorical)
Units—Scale from 0 to 5
Concerns—The severity of a cold seems subjective and difficult to quantify. Scientists may feel pressure to report negative findings of herbal product.

20. *Who*—American vineyards
Cases—Each vineyard is a case.
What—Size of vineyard, number of years in existence, state, varieties of grapes grown, average case price, gross sales, and percent profit
When—Not specified
Where—United States
Why—To provide information for American grape growers
How—Not specified
Variable—Vineyard size
Type—Quantitative
Units—Acres
Variable—Number of years in existence
Type—Quantitative
Units—Years
Variable—State
Type—Categorical
Variable—Varieties of grapes grown
Type—Categorical
Variable—Average case price
Type—Quantitative
Units—Not specified (dollars?)
Variable—Gross sales
Type—Quantitative
Units—Not specified (dollars?)
Variables—Percent profit
Type—Quantitative
Units—Percent

21. *Who*—Streams
Cases—Each stream is a case.
What—Name of stream, substrate of the stream, acidity of the water, temperature, BCI
When—Not specified
Where—Upstate New York
Why—To study ecology of streams
How—Not specified
Variable—Stream name
Type—Identifier
Variable—Substrate
Type—Categorical
Variable—Acidity of water
Type—Quantitative
Units—pH
Variable—Temperature
Type—Quantitative
Units—Degrees Celsius
Variable—BCI
Type—Quantitative
Units—Not specified

22. *Who*—Each model of automobile
Cases—Each vehicle model is a case.
What—Vehicle manufacturer, vehicle type, weight, horsepower, and gas mileage for city and highway driving
When—Current
Where—United States